

Angles Formed by Intersecting Lines

Name(s): _____

When two lines intersect, they form four angles. The point of intersection of the lines is the vertex of all four angles. In this activity, you'll investigate relationships between pairs of these angles.

Sketch and Investigate

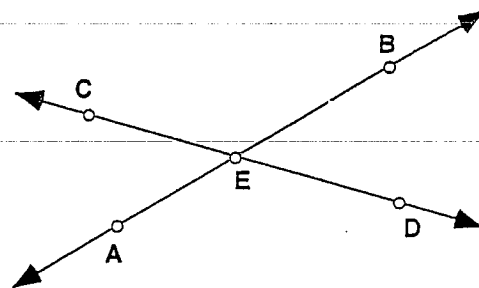
1. Construct \overleftrightarrow{AB} and \overleftrightarrow{CD} so that they intersect.

2. Construct point E where the lines intersect.

To measure an angle, select three points, with the vertex your middle selection. Then, in the **Measure** menu, choose **Angle**.

3. Measure the four angles $\angle DEB$, $\angle BEC$, $\angle CEA$, and $\angle AED$.

4. Drag points B and C and look for relationships among the angle measures. Make sure to keep point E between points A and B and between points C and D .



Q1 In your sketch, $\angle DEB$ and $\angle CEA$ are a pair of *vertical angles*.

a. Name another pair of vertical angles. _____

b. Write a conjecture about the measures of vertical angles.



Q2 In your sketch, $\angle CEB$ and $\angle DEB$ are a *linear pair* because two of their sides form a line.

a. Find and name all the other linear pairs in your sketch.



b. Write a conjecture about the relationship between angles in a linear pair. Use the calculator to test your conjecture.



Q3 Drag a point in your sketch until the angles in a linear pair are congruent. Describe all four angles.



Select three of the four angle measurements →

then choose **Edit:**
Action Button:
Hide/Show.

5. Make a pair of Hide/Show buttons for the four angles.

6. Double-click the Hide button. It should hide the three angle measures.

Angles Formed by Intersecting Lines (continued)

Q4 Drag a point so that the one visible angle measure is 63° . Find the measures of the other three angles without looking. Write your guess below, then double-click the Show button to check your guess.



7. Test yourself a few more times for practice: Hide the angle measures, drag to change the angles, guess at the hidden angle measures, then check your guess.

Explore More

1. Suppose you had three lines intersecting in a single point to form six angles.
 - a. How many angle measures would you need to know in order to find the other angle measures?
 - b. Describe any situations in which all the angles are congruent.
2. Suppose you have four lines intersecting in a single point to form eight angles. Answer parts a and b from Explore More 1, above, for this different case.
3. Now generalize your results from the last two questions. Suppose you had n lines intersecting to form $2n$ angles. Answer parts a and b from Explore More 1, above, for this general case.